

Duncan Angwin and Uma Urs

The effect of routine amalgamations in post acquisition integration performance: whether to 'combine' or 'superimpose' for synergy gains?

*Advances in Mergers and Acquisitions* (2014)

JAI Press (Emerald Group Publishing Ltd)

No DOI

This version is available: <https://radar.brookes.ac.uk/radar/items/eebc9f76-2e83-4716-89f4-14584fb215f4/1/>

Available on RADAR: 07.04.2016

Copyright © and Moral Rights are retained by the author(s) and/ or other copyright owners. A copy can be downloaded for personal non-commercial research or study, without prior permission or charge. This item cannot be reproduced or quoted extensively from without first obtaining permission in writing from the copyright holder(s). The content must not be changed in any way or sold commercially in any format or medium without the formal permission of the copyright holders.

This document is the published version.

*Advances in Mergers and Acquisitions* (2014)

JAI Press (13): 153-179

**The effect of routine amalgamations in post acquisition  
integration performance: whether to ‘combine’ or  
‘superimpose’ for synergy gains?**

by

**Angwin, D.N.**

Oxford Brookes University

Oxford

and

**Urs, U.**

Oxford Brookes University

Oxford

**Introduction**

Post acquisition integration is widely understood to play a key role in the success and failure of mergers and acquisitions (Haspeslagh & Jemison, 1991; Jemison & Sitkin, 1986; Marks & Mirvis, 1998; Pablo & Javidan, 2004; Shrivastava, 1993). However, there is general consensus that the majority of acquisitions under-perform (Schoenberg 2006; Zollo & Meier 2008). In order to explain this under-performance many studies have focussed upon how the post acquisition integration process acts as a mediating variable upon performance (Haspeslagh & Jemison, 1991). Researchers

examining that phase of activity have tended to adopt an organizational level of analysis when considering variables such as culture, leadership, strategic fit, organizational fit and learning (Cartwright & Cooper, 1996; Datta & Grant, 1990; Epstein, 2004; Marks & Mirvis, 2001; Sitkin & Pablo, 2004; Waldman & Javidan, 2009; Bower, 2001). These studies have revealed important insights into integration difficulties (Bower, 2001; Björkman, Stahl, & Vaara, 2007) but clear links to acquisition outcome have remained elusive. One reason may be the dynamic characteristics and complexities within organizations that serve to confound organizational level analysis and so acquisition performance. For this reason, more fine-grained approaches are necessary to understanding sub-organization processes during acquisition integration. To date studies at the sub-organizational level of merging organizations are few in number and dispersed across disciplines, with many adopting a functional unit of analysis. There is a need to adopt a concept not bounded by functions and with the ability to achieve insights across various parts of the organization during integration.

In this paper we focus upon routines as a concept applicable across organizations at the sub-unit level and upon which organizations depend as their building blocks. Their link to organizational performance is assumed to lie in their aggregation in order to form higher order routines that in turn can be considered capabilities (Winter 2003). From a resource-based perspective, these capabilities are linked to organizational performance (Barney 1991; Grant 1991). From the standpoint of routines, we therefore conceive of post acquisition integration as the amalgamation of bundles of routines in order to achieve synergy benefits. We anticipate that the way in which these bundles of routines are amalgamated is linked to post acquisition integration outcome. In order to examine the amalgamation process, we therefore focus upon those acquisitions<sup>1</sup> where synergy benefits are achieved through the internal effortful actions of managers, enacted through routine amalgamations.

Whilst there is a significant body of research into the nature of routines, much of this research has focused upon a routine in isolation, rather than its amalgamation with another routine to form new routines or bundles of routines. The research has also

---

<sup>1</sup> There are a sizable number of M&A which achieve benefits through the transaction itself, and through immediate positive effects relating to increased size. These benefits are not the consequence of internal managerial actions, and so not included in the discussion in this paper.

tended to focus upon a routine of a single organization rather than examining the fusion of routines across different organizations. The discussion of routines has also tended to downplay the role of other contexts, such as the macro context, in the evolution of routines.

This paper is distinctive in examining the amalgamation of routines in merging companies in order to reveal the integration process itself and its organizational level consequences. Using two exemplar case studies the paper shows how different approaches to amalgamation, namely 'combination' and 'superimposition' take place and their differential impact on organizational outcomes. It also reveals the importance of context in shaping the amalgamation process and the performance of the organization.

The paper is organised in 5 sections. First the need for a new way to investigate post acquisition integration is discussed and the use of routine and routine aggregations as valuable concepts proposed. This is followed by the method section which outlines how data was captured for the study and the use of exemplar cases to describe two types of routine amalgamation. Analysing the two case studies shows how routine amalgamation unfolds over time and how it impacts overall integration performance. A set of propositions are generated that can be tested in future research and common themes further discussed.

### **Post-acquisition integration**

Mergers and Acquisitions is an activity that can be traced back to the 18<sup>th</sup> century and persists today world-wide with total deal value running into trillions of dollars. Despite the magnitude of activity and its persistence over time, performance studies, employing a wide range of methodologies and carried out at various points in time across a variety of geographies, continue to indicate that at least 50% of the acquisitions fail (Tetenbaum 1999; Angwin, 2003; Schoenberg 2006; Zollo & Meier 2008). In order to understand this underperformance, researchers are focusing upon the key role of post-acquisition integration (Souder & Chakrabarti 1984; Haspeslagh & Jemison 1991; Shrivastava 1993; Angwin 2007), as a mediating variable, between acquisition potential and performance. For some the post acquisition phase is where

the value of an acquisition is won or lost (Haspeslagh & Jemison 1991). Post acquisition integration involves coordination, control and combination of the activities of firms involved in the transaction (Shrivastava 1993) and it is opening up this black-box which is needed in order to shed light on the process of integration, how it is done, layers or levels and the decision making process (Bower 2001). Existing literature focuses predominantly at the organizational level of analysis examining issues such as knowledge transfer (Zollo & Singh, 2004) structural fit (Haspeslagh & Jemison, 1991; Angwin & Meadows, 2013), leadership alignment (Waldaman & Javidan, 2009; Sitkin & Pablo, 2004) and culture (Bauer & Matzler, 2013; Cartwright and Cooper 1992, Stahl, Chua, & Pablo, 2012) and autonomy (Zaheer, Castañer, & Souder, 2013). These studies reveal important insights into integration difficulties (Bower 2001; Stahl, et al. 2012) but clear links to integration outcome have not been made in a consistent manner (Cartwright, et al. 2012).

This has led to calls from scholars to look more inside organizations to obtain a finer grained understanding of how sub-organizational units can affect acquisition integration performance. There are few studies at this level investigating the performance effects of functional integration, such as Homburg and Bucerius (2005), who conclude that marketing integration and the way in which the function is integrated is highly relevant to this unit's performance. In the same vein, Palmatier, Miao and Fang (2007) provide a framework for integrating sales channel in order to improve functional integration performance. Studies such as these however still stop short of digging into organizations for better explanations. For instance in marketing and sales terms they do not help explain how ordinary day-to-day business activities such as customer orders, complaints, returns, product pricing and promotions are actually integrated. It is time for M&A researchers to get their hands dirty and engage more fully in sub-organizational investigation in order to better understand some of the integration complexities which may affect acquisition performance. This also has implications for the methodologies chosen for this sort of investigation (Cartwright, Teerikangas, Rouzies & Wilson-Evered, 2012), favouring in-depth qualitative approaches and hybrid approaches (Angwin & Meadows, 2009)

## **Organizational routines**

Firms can be considered as bundles of routines that need to be amalgamated in some way in order to realise integration synergies during an acquisition. Research into organizational routines can be traced to the foundational work of the Carnegie School (Cyert & March, 1963; March & Simon, 1958; Simon 1947). Two streams can be detected – capabilities and practice (Parmigiani & Howard-Grenville, 2011). While the capabilities school is grounded in organizational economics and views routines as the building blocks of capabilities with repetitive and context-dependant nature (Dosi, Faillo & Marengo, 2008 p.1167), the practice perspective is rooted in organizational theory and draws upon the works of social theorists such as Bourdieu (1977, 1990) and Giddens (1984) to explain everyday action. This practice stream defines routines as ‘generative systems’ that have multiple variations depending on the circumstances (Pentland & Feldman, 2008b, p.281). Attention now is directed towards bridging these two streams by understanding routine dynamics that calls for understanding the micro origins of routines and capabilities (Barney & Felin, 2013).

The few studies which exist of routines in acquisition integration, such as Karim and Mitchell (2000), Mitchell and Shaver (2003), Paruchuri and Eisenman (2012) and Zollo, Reuer and Singh (2002) show how learning and knowledge management may occur through routines, but this research has not focused upon practices on the ground – how actions in routine combinations interact to bring about meta-routine outcomes. This process of amalgamation, in order to achieve organizational outcomes, has not been addressed.

This paper explores the routine action of ordinary routines, their relationship with other routines and aggregations of such actions over a chain of routines in order to reveal how higher order routines maybe influenced, and in turn, affect overall acquisition performance. By showing the aggregation of action over a chain of routines and observing the outcome of the higher order routine this study bridges the capability and practice streams.

In order to integrate two firms, decisions need to be made about which routines to preserve and which to amalgamate. In terms of amalgamation, a choice needs to be made whether to use ‘combination’ or ‘superimposition’ in order to achieve synergy

gains. ‘Combination’ is ‘*a joining or merging of different parts or qualities in which the component elements are individually distinct*’ (Oxford English Dictionary, 2014). It involves combining all the constituents of routines including actors and artefacts. ‘Superimposition’ is the ‘*placing or laying one thing over the other*’ (Oxford English Dictionary, 2014). It involves laying the acquirer’s routine on top of the acquired company’s routine. Combination might be used in acquisition integration in order to achieve a ‘best of both’ outcome, so that the resulting routine is intended to be superior to either the acquirer’s or acquired’s routine prior to integration. Superimposition may occur where one company (often the acquirer) believes its routine should be chosen over the other, often in the belief that it is better in some way. Through superimposition, the ‘better’ routine is intended to supersede the lesser routine. In both cases synergy benefits are expected to result with combination allowing a new superior routine to operate and in the case of superimposition, the adoption of the better routine should allow efficiency gains over the use of the less good routine.

This paper presents two exemplar cases that reveal the process by which routines combined or were superimposed. In tracing these processes, the difficulties encountered in the integrations are highlighted and linked to acquisition performance.

## **Method**

For in-depth integration of routines over time we engaged in rich qualitative research techniques to capture micro level detail and nuances of actions. Large horizontal acquisitions, where the main strategic rationale was to achieve synergy gains through integration, were selected. In order to achieve some measure of generalizability we looked at firms in different geographies and in different industries. In total we studied 18 integrations, collecting data over a 36month period. Although the ultimate aim is to generate a synthetic case study for each of the amalgamation types, in order to capture the richness of routines integration, in this paper we focus upon 2 exemplar cases that seem to us to epitomise the main issues we are encountering in examining routines amalgamation. The two cases are 1) Firm F - a pharmaceutical firm in India and 2) Firm B - a banking firm in the UK. We conducted 15 interviews over time with Firm F and 18 interviews over time with Firm B. As the objective is

to understand business process integration, members of the integration team and line managers were interviewed. Interviews lasted for 60 minutes on average, were recorded and transcribed, resulting in 1340 pages of data. Interviews were semi structured in the sense that suitable prompts were used to steer the conversation with the aim of getting examples, stories and in-depth information on integration routines, actions taken and how routines interacted over time. The interviewees shared their experiences in terms of how they participated in the integration, their role, what went well and what did not, the challenges faced, differences in business process between the two organizations, how those differences were addressed and issues surrounding integration design and execution.

The interview data is supplemented with documentary sources in the form of internal artefacts such as project data sheets, project plans, Gantt charts and process flow diagrams. These documentary sources provide rich insights into organizational processes and how the projects are organized. They are also used to triangulate interview data (Miles & Huberman, 1984).

### **Data Analysis**

In order to make sense of the data we used ‘retroduction’ as our method of analysis. This involved iterating between inductive and deductive techniques giving both data and theory equal importance. We started with existing theory about routines and used that to sieve out routine centric data from the interview data. Our overall focus was on processual routines within operations and marketing functions. In both cases, the firms involved in the transaction had their own pre existing routines that enabled us to then record how those routines amalgamated during integration.

Systematic multistage analysis process was used for analysing data. First, the interview transcripts were sorted in two different ways; first all the transcripts belonging to the same integration were grouped together, followed by the firm and then to get a better view of business processes, transcripts were also organized based on the business function and then ordered based on the interview date. This sorting enabled us to have views across the cases in addition to having in depth access to each case.



Coding followed sorting and was done to identify patterns and themes. Non-codes form an integral part of this analysis as not all data can be coded (Mason, 1996). These codes were then tabulated. Comparison charts to show the pre and post acquisition status were drawn. The non-codes and interpretive analysis of the interview transcripts facilitate drawing of these charts. This phase is in line with Miles and Huberman's (1984) display stage. These visual representations were later used in the memo creation to highlight the changes in process pre and post acquisition and the impact of such superimposition of processes was analyzed.

The use of thumbnails, one line case descriptions, provided useful snapshots of what each case is about. By plotting activities on a temporal scale, timelines were drawn to compare integrations. These timelines and thumbnails together with the non-codes allow memo creation - theorizing write-up of ideas about codes and their relationship as they strike the researcher while coding (Glaser, 1978). Here our objective was to associate memos with their corresponding routines. These routines were identified through process patterns. The existing routines scholarship provided the basis for identifying the routines and process patterns. Each memo describes a particular routine or an event. Here all the various memos created in the previous step were used to construct routine definitions and hierarchies (Nelson, 1991; Winter, 2003). This formed the basis to examine routine interactions. A short commentary for each case was then created where different routine attributes are described and corresponding link to the performance of routines or the group of interrelated routines is made. In the final step of analysis, important insights were grouped and propositions constructed to further develop either theoretical or conceptual contribution.

In this paper we have chosen 2 exemplar cases to explain two different approaches to routine aggregation. The cases chosen in this paper, 1) represent fundamental business activity 2) reflect the complex action situated in simple routines 3) show the impact on both cost and revenue and 4) show evolution of routines over a period of time.

### **The case of routine 'combination'**

Firm F is located in India and specialises in production of generic drugs on a large scale. When it acquired an original manufacturer Panex Inc in an advanced economy, with the aim to expand the business overseas, synergy realization by leveraging common business processes was the main goal of post acquisition integration. However, well-established process routines in both the firms posed challenges for integration.

### **Pre-acquisition**

Firm F's planning and procurement strategy was geared towards efficiency and low cost with low inventories and frequent replenishment cycles. The purchase order (PO) placement cycle was managed on a work-day calendar. In contrast, the Panex Inc used a long term procurement plan and placed POs on a quarterly or half-yearly basis as shown in Figure 1. Suppliers actively participated in demand supply meetings hosted by the buyers at the beginning of each year and incorporated flexibility in their supply plans.

-----

Insert Figure 1 here

-----

Firm F's procurement process was well controlled and monitored. Approval mechanisms were put in place to ensure appropriate PO placements. Depending on the PO value managers at different levels approved the PO. For example, for PO exceeding \$25,000, line manager approval was necessary and those exceeding \$50,000 had to be approved by the division's director. This approval is controlled by a predefined matrix, in the automated workflow application, part of the Enterprise Resource Planning (ERP) system. In contrast, buyers of Panex Inc often used their discretion to decide on the PO quantity and timing.

Panex Inc's business was built around specialised products that were highly regulated. Healthy profits kept management focus away from operations cost and efficiency. They held large inventories and material planning was not done aggressively. The procurement function reflected this strategy by allowing buyers to place PO at their discretion to procure special compounds that were made by a

handful of suppliers. Supplier relationship was the crux of the deal. Firm F on the other hand had a dominant position over its suppliers as there was no single supplier who could meet the capacity needs of Firm F's demand. ERP system was sufficient to manage this relationship with automated PO transmission. Being a generic manufacturer, Firm F placed importance on operations strategy to bring down costs. Firm F's ERP application was designed to provide uniform control, visibility and it assumed the central role of coordination allowing seamless information flow across all the related functions such as planning, warehousing, finance and audit. The PO routine along with all the players and related routines is shown in Figure 2.

-----

Insert Figure 2 here

-----

*“Before these acquisitions, we used to be a team of 48 buyers managing PO for 7 manufacturing locations. Our supplier base had over thousand entities. We had the same policy throughout and we still have stringent audit controls. All these controls are built into the system. [...] so we are very much dependant on the system”. – Buyer of Firm F (acquiring firm)*

However, in Panex Inc even though ERP system was in place the buyer coordinated all the activities across all related partners.

## **Integration**

During post acquisition integration a decision was made to keep the Firm B's ERP systems as they were on the latest version of the software and all the IT assets of Panex Inc were marked for a phased closure. At the same time, integration was expected to cause little disturbance for existing business processes as the aim was to manage the transition as smoothly as possible. While the IT team pushed for adaptation of existing process in order to minimise changes to the ERP, the Panex Inc's existing routines suited the specialist nature of its products. The integration manager on the other hand was driving for operational efficiency and synergy utilization.

*“We put the two processes side by side. Our new colleagues felt very strongly about ERP system replacing the buyer’s activities. In our case, we had the workflow in the ERP system that allowed seamless interaction and transparency. If one of buyer does not turn up for work next day we still can continue our function.”* Supply chain architect of Firm F

*“There was collision in terms of scope of integration. Changing the existing process in the acquiring firm was not in the scope of integration. At the same time acquired suppliers and employees felt the process changes do not suit the specialised products that they were handling.[...] our IT warned us against making so many custom changes in the system. In the end it all boiled down to negotiations as to what process would they like to keep and what not”.* Integration manager

The two routines were horizontally combined creating a super set of ostensive rules and performative variations. The ERP system was designated to assume the central role of coordination while it provided the flexibility to place either a monthly PO or a quarterly PO. PO approval rules were retained with higher limits. Editable PO numbers allowed the use of the old formats, as suppliers were reluctant to adopt new numbering. The buyers of Panex Inc had to adhere to the policies and work with the demand supply planners and suppliers to keep low levels of inventory. The policies and rules were written up and all the members had to undergo M&A training. Panex Inc’s suppliers were told to invest in IT system communication. Delays in supplier commitment led to delays in integration. While a few agreed to make the changes, most of them declined.

### **Post integration**

*“There were many errors that cost us huge \$\$. We failed many audits. Our PO was still open in the system but we already had received delivery against those PO. Senior management was surprised how a very basic process like PO to suppliers could cause so much disruption to day to day operations.”* – Integration manager

The extensive modifications to the ERP system to accommodate the newly acquired business led to major IT errors due to a variety of reasons such as master data setup, training, and PC connectivity in the warehouse. The standard routine was disturbed

and the ERP system was rendered unstable. Day-to-day operations switched into fire fighting mode with ad hoc routine modifications to enable manual communication and workarounds. As this continued for several months process owners got accustomed to workarounds even after the service levels of ERP application were normalised.

*“Earlier we had a single standard logic built into the system to send out the messages to relevant parties. Now the screen itself looks different. It is no longer user friendly. Too many if-then-else are built into that logic and there are too many errors. Instead of waiting for IT to resolve these issues, we feel it is better to send a fax or call our suppliers and warehouse partners ourselves.”* – Buyer of Panex Inc (acquired firm)

Panex Inc’s buyers who earlier liaised with all the parties over the phone continued to do so bypassing the standard features of ERP application. Before the integration, the buyers of Firm F did not use the workarounds, as there was no need to deploy them. After the integration they bypassed the ERP application and continued to do so as they felt the system was no longer user friendly.

*“Everybody formed their own rules and followed what ever worked for them. From very efficient and well controlled processes we moved into a free for all world”.* Operations manager of Firm F

The ostensive rules of both the routines continued to exist independent of each other and along with the workaround processes, several variations of these rules were created by the buyers. These competing ostensive rules created logical mazes, of if-then-else rules. The ERP system being the technical artefact at the centre of the routine hosted this maze of ostensive rules that eventually dislocated it from the centre to the periphery of the routine. The variations in PO routines directly impacted the routine performances in other interrelated processes such as manufacturing, logistics, finance and planning where similar combinations were happening.

*“Inventory mismatches between actual and what is shown in the system was the worst of all problems. From a very efficient zero error operations we moved into a*

*chaotic, high cost and in many ways unexplainable organization*". Operations manager of Firm F

## **2 years after integration**

*"We had done people integration following the acquisition completion. [...] However, that was only for reporting purposes. People's responsibilities were not integrated. [...]"*

*"As we started to manufacture most of the intermediate compounds and took on more and more contract manufacturing, consolidation of operations team was inevitable [...]. The intention was to have one centralised procurement team responsible for all procurement activities across all regions. With this change, one buyer was responsible for a group of compounds that either originally belonged to us or was from acquired firm or a new source. This partially solved our chaos. Each buyer now wanted a uniform process for all the products that they handled. That allowed us to somewhat streamline the processes. But, still, we are not what we used to be before."* Operations manager of Firm F

Combination of two routines by bringing them together while keeping the actors, action, and rule silos meant several variations of the routine remained separate. It was a change in the context that forced the breakdown of silos allowing full combination of the routines.

## **The case of routine 'superimposition'**

Firm A is a leading international bank headquartered in the UK. In order to expand its local market in the UK, Firm A went on an acquisition spree and made three acquisitions during the recent banking crisis (2008 – 2013). The acquisition of a local banking firm NBank at a time when regulatory checks and guidelines have dominated the financial industry landscape has made post acquisition integration a four year task with large teams. In this section, we explain the remediation routine aggregation from the longitudinal study of NBank integration. This routine is chosen

due to its importance for meeting the regulatory requirements as banking operations are now focused towards meeting the regulatory guidelines.

Anti-money laundering (AML) guidelines make Know Your Customer (KYC) checks mandatory and thorough. Even though regulators provide general guidelines on how these checks should be carried out, each bank has to interpret these guidelines to develop their own rules and processes. After the formal completion of acquisition, Firm B was responsible for enforcing regulatory AML norms for all the acquired customers. Although most of these acquired customers were already checked by the NBank (acquired bank) and were operating within the AML guidelines, Firm B had to bring them to its own regulatory standards. A special taskforce for remediation was created under the integration project to audit and review all the acquired customers, their past transactions and documentations provided to the bank.

*“We had no choice at all. We had to vet them and update our database. This involved going back to customers asking for more documents [...] like, building the map of their holdings, who are the directors, signatory authorities etc etc. [...] Not all customers were happy though.”* Operations manager of Firm A

Being a large global bank Firm A had multiple levels of KYC checks and in comparison, being small and local, NBank had a much simpler check. Within Firm A separate business units catered for different type of customers such as consumers, small medium businesses, corporate, large enterprises and investment divisions and had different types of KYC checks. In contrast, all types of customers were parked under one division in NBank.

*“[...]. The acquired customers had to be first classified into different types that actually fall under different business units and then each division had to do their own KYC checks. This posed a significant challenge to distribute the staff and the amount of time spent understanding the customer base was significant.”* – Integration manager

The remediation process during integration completely ignored the KYC checks done by the NBank. Instead they treated all the acquired customers as new customers and carried out the checks afresh.

*“We decided that it was cleaner and foolproof to do all the checks again. [...] At the end of the day we are still responsible and own all the risks.” - Integration manager*

*“They ignored all our existing processes. We were also doing exhaustive KYC checks. They said it is not possible to combine the checks. Our customers were outraged. They did not like those questionnaires at all. Imagine asking one of the top 100 richest people in the world who has banked with us all his life to fill his personal details in a form!” -KYC analyst of NBank*

The KYC routine for new accounts starts with receiving all the relevant documents from the customers, doing necessary background checks on the customers and then updating the details in the Firm’s IT system. Customers can initiate any further transaction only if these checks are passed. As such these KYC and audits assume a central role in the day-to-day transactions in a bank. While the relationship director faces the customers and handles the customer communication, the KYC analyst coordinates all the activities within the bank and deals with the compliance team for AML clearance. Similarly all money transfers are also checked for AML clearance before the transaction is initiated.

*“We went through many hours of training to understand the compliance rules of our new firm. We also had buddies whom we could consult when in doubt. Still it took a lot of effort and time to get to know the process especially because we were always used to saying ‘yes’ to our customers and we directed our operational staff and in most cases got the clearance from the compliance directly.” – Relationship director of the NBank*

Being a small local bank, NBank thrived on personalised customer relationship irrespective of the type and size of the customer. As such, the relationship director who faced the customer assumed the central role of coordination between the bank and the customer. Upon acquisition, this coordination role was split between the relationship director and the KYC analyst and only those high net worth customers



enjoyed the personalised service. KYC analyst contacted the customers directly in cases where additional information was needed from the customers.

*“We were put in a spot. We had to take the wrath from customers and at the same time answer the KYC and compliance teams. There were customer attritions but even customers know that all large banks do plethora of checks these days [...]”* – Relationship director of NBank

All high net worth customers of NBank were contacted prior to the deal and regular feedback and appraisal sessions were scheduled with such customers. A detailed communication was sent to all the customers about the impending KYC checks after the acquisition.

*“We did face unhappy customers. Though we had factored that in the acquisition plan and prepared detailed communications we faced attrition. Trying to balance the need to ensure compliance while retaining customers turned out to be challenging [...]. Customers had been banking with our acquired firm for many years and we went in there asking them documentations to prove their legitimacy.”* – Integration manager

Unlike Firm F here routines were not combined but were superimposed. NBank’s routines decayed and the acquiring firm’s routine was imposed on the actors and customers of the acquired firm. Such a superimposition contributed towards customer attrition. Additional customer communication routines were put in place to reach out to the acquired customers and product offerings were enhanced to entice these customers to stay with the bank.

*“Customer communications stream had to include remediation needs in their objectives. Interventions to entice customers were a bit late. Most customers especially the enterprise customers multibank and all banks ask for same set of documents for KYC checks. We can’t proceed without those papers but we can change the way we ask for them.”* – Remediation lead

These interventions allowed the routines to stabilize over time. Though customer attrition was cited as the biggest concern throughout the acquisition process,

effective communication routines were expected to halt the attrition. Customer profiling, product mapping and new promotions were supposed to offset customer disgruntlement. These processes though relied on each other creating a network of dependant actions. Product mapping for acquired customers was dependant on both customer profiling and remediation while remediation was done depending on the type of products assigned for the customers and all this required customer communication and consent.

-----

Insert Figure 3 here

-----

Figure 3 shows this interdependency of remediation routine across different functions. Though it is not clear how much remediation contributed towards customer attrition it is regarded to be one of the significant reasons for customer unhappiness.

### **Observations about routine amalgamations**

In terms of the case showing amalgamation of routines through ‘combination’, individual components remained distinct for sometime, resulting in an unstable routine with multiple variations of ostensive and performative patterns. Feldman (2004) has emphasised the consequences of unintended patterns of action during an organization change. In this setting, while the intention of combination was to retain the stability of established routines, in fact a multiplicity of ostensive and performative variations occurred. The two routines were performed on different time scales that suited their business contexts. Combining the routines did not result in a common timescale and common pattern of action as the two different business contexts continued to co-exist. This observation leads to proposition one:

***Proposition 1:*** *Amalgamating two stable routines through ‘combination’ when enacted on different timescales for different contexts, results in crowded and scattered patterns of action.*

Our empirical investigations reveal that the resulting inconsistency due to this scattered pattern of action forced the actors to develop their own interpretations of

rules and what works. Recent studies on routines indicate how actors develop and modify their understanding of ostensive aspects of a routine (Essén 2008, Rerup & Feldman, 2011). When two such routines are combined, in addition to the existing variations, the actors involved developed more variations to circumvent the issues posed by the amalgamation. The resultant routine is a super-set of variations that compete against each other.

The purchase order routine demonstrated in this case is embedded within the procurement process and is interlinked with other routines in planning, logistics and finance as shown in Figure 2. Lack of visibility into PO management led to ineffective demand supply planning and warehouse inventory management. Along with inventory balancing issues this impacted the operations cost. Amongst nested routines, instability in one of the routines traverses across the whole nested structure. This, in conjunction with the effect of similar combinations of other routines in that nested structure renders the whole higher order routine unstable resulting in performance implications.

The technical artefact in the form of ERP application played an important role in both the routines before the combination. For Firm F, ERP application assumed the central role of coordination and control by providing visibility to all levels of management. The role of artefacts in routine enactment is long established (D'Adderio, 2003, 2008). Our observation about technical artefacts being at the centre of the routine embodying the ostensive aspects and directing the performative variations is in line with D'Adderio's (2011) work. In this setting, this technical artefact is a shared asset at the centre of nested routines. Modifications to this artefact in order to enable routine combination impacted all the actors who used the artefact both directly and indirectly. Existing studies in routines have stressed the importance of the multiplicity of the routine patterns in understanding the routine coordination (Pentland & Feldman, 2008a; Turner & Rindova, 2012). However, in situations where a technical artefact assumes the central role of coordination and control, the multiplicity of routine patterns inhibits its capability for coordination and control.

Felin, Foss, Heimeriks and Madsen (2012) highlight two types of process routines – those that are deployed with strict adherence to rules and those that allow flexibility and discretion. In this research setting, the two routines that were combined belonged to each of these categories. Combining these two together by keeping the elements separate failed to achieve the desired performance.

In terms of routine amalgamation through ‘superimposition’, we observe a much smoother transition inside the acquired business in comparison to ‘combination’. However the impact on external entities such as the customer was large. ‘Superimposing’ a routine affected revenue generation although was internally efficient in outcome. However using a ‘combination’ approach resulted in increased internal inefficiencies. This observation leads to our next proposition.

***Proposition 2:*** *Over time, amalgamating a routine using ‘combination’ negatively affects internal efficiency whereas ‘superimposing’ a routine is efficient internally but has a negative effect on external stakeholders.*

In both cases, external action helped to stabilize the routines. Organization structure changes redefined the procurement function and established a central procurement team. Buyers had to manage both acquired and acquirer’s products and this smoothed ostensive and performative variation of the PO routine. A strongly linked customer communication routine tried to offset the effects of superimposition. Next proposition captures this observation.

***Proposition 3:*** *External interference, either in the form of a new routine or context / structural change is needed to stabilize amalgamated routines.*

## **Discussion**

Conceptualising post acquisition integration as an amalgamation of similar routines of two participating firms provides insights into overall integration outcome and also unpacks the properties of routines. This paper reveals how post acquisition integration is about aggregating the ordinary routines of two firms. And in this regard, a key question is whether to ‘combine’ or ‘superimpose’ routines? From our

observations of our exemplar case studies a number of propositions emerge – see table 1.

-----

Insert Table 1 here

-----

Revealing the different processes of routine amalgamation through ‘combination’ or ‘superimposition’, opens up the black box of integration by explaining how process functions are brought together during integration. It also sheds light on important themes related to routines – their ‘transformation’, ‘multiplicity’, ‘nestedness’, ‘temporality’ and ‘sensitivity’ to context.

In terms of routine ‘transformation’, Pentland, Feldman, Becker & Liu (2012) propose generative systems model for routines and link that with the VSR (Variation, Selection and Retention) framework to explain the dynamics of routines. VSR framework, adopted widely in organisation learning literature (Miner, Michael & Gong, 2008), breaks the learning cycle into 3 processes – 1) create variation in the routines, 2) select among these routines for which ones to enact in the future 3) retain the new routines. While VSR model provides explanation for transformation of learning routines, in this research routine aggregations serve as vehicles of transformation for process routines.

In the case of routine combination and superimposition, the routines that were combined and superimposed went through transformation over time before they were stabilised in the new organizational setting as shown in Figure 4. At the time of integration (t1) both routines were placed side by side. In case of combination a super-routine was created (t3) and during superimposition the routine being imposed upon became a shadow routine (t3) that eventually decayed. The resulting routine in both cases was deformed because of the resultant instability (t4). Superimposition resulted in customer attrition. At t5 structural changes were introduced in both cases. An enhanced communication routine was attached to the superimposed routine and organization structure change was introduced for the combined routine. While these changes brought some order to the modified routines (t6), eventually (t7), the

combined routine was still unstable resulting in increased operations cost and the superimposed routine continued to result in customer attrition.

-----

Insert Figure 4 here

-----

This illustration of routine transformation during integrations through amalgamation allows explanation of integration outcome such as increase in operating costs or customer attrition. The cases shows that apart from high costs incurred in integrations, the process itself increases operations costs. The combination of routines is intended to cause little disruption to external stakeholders such as customers and suppliers of acquired firms. However, as shown in the PO routine combination, internal stakeholders are impacted leading to ballooning operations costs and inefficient supply chains. ‘Superimposed’ routines on the other hand may allow internal efficiencies through a smooth implementation, but may impact external stakeholders adversely, leading to reduction in revenue stream and customer attrition.

In terms of ‘multiplicity’, the routines literature has much to say (D’Adderio, 2011; Feldman, 2003; Howard-Grenville, 2005; Pentland & Feldman 2007; Turner & Rindova 2012). Narrative network theory of routines for instance (Pentland & Feldman, 2007) explains the possibilities of intended and unintended actions of a routine and in our cases, when two nested routines with multiple variations are combined, the number of paths of intended and unintended actions increases. This leads to instability in routine action as demonstrated in the case of PO and remediation routine aggregations.

ERP applications facilitate coalescing of all related processes to provide real time information across various functions in the organization (Akkermans & Van Helden, 2002). Though technical artefacts are designed to cater for multiplicity (D’Adderio, 2008), our cases show that entire systems of actors, artefacts and routines, are muddled by modifying technical artefacts. Combination of routines invariably modifies the central technical artefact that impacts all the related routines.

The routines literature acknowledges the significance of ‘nestedness’ (e.g., Howard-Grenville & Carlile, 2006). However, empirical research exploring the nestedness of process routines is sparse. Only by situating the PO routine among its interrelated routines and observing the implications through the network of these routines can we study the performance of routine ‘combination’. In addition to the ‘nestedness’ of routine action between two routines, involvement of multiple actors from different functions within the same routine infers nestedness between actors, action, participants and artefacts (D’Adderio, 2011). The remediation routine of Firm A involves action from relationship managers (from sales coverage team) and KYC analysts (from KYC operations) with customers as participants and artefacts based on compliance, controls and statutory guidelines. This nestedness within the routine and the interconnectedness with other external routines (as shown in Figure 3) creates a complex web of action and interaction. Combination or superimposition of routines in such situations is not just amalgamation of two routines instead it is the aggregation of nested actions and interactions.

The cases show the importance of context as both an inhibitor and facilitator of routine amalgamations – and yet the role of context has featured little in routine research to date. As the case of PO routine combination suggests, the two PO routines were serving their respective business contexts where one was generic and large volume business while the other was niche and specialised. Until these diverging contexts were unified with the evolving business model, in the form of contract manufacturing and backward integration of supply chain that resulted in a central procurement team with shared responsibilities, the combined PO routine had scattered patterns of action. The case of remediation highlights the importance of external business context. Remediation is an ongoing activity in all major banks across the globe for all customers due to regulatory environment following the recent banking crisis. These cases show how macro context seeps through the organization in the form of micro context to influence the actions of ordinary routines. Pettigrew (2012) has called for process research to link context to outcome over a period of time and in this research the actions of amalgamating routines is shown to link to context change and organizational performance.

Underlying routine amalgamation is the central role of ‘temporality’, which Winter (2012) has stressed as crucial to the study of capability foundation. Studying routine aggregations in the context of post acquisition integration reveals not only the temporality of routines but shows the difficulty in assessing the performance implications of post acquisition integrations. Only by tracing routine aggregations and combinations over a period of time can we study the performance of routines. Failure to collate the two calendars as in the case of routine combination, where one routine was performed on work day basis and the other following a quarterly / half yearly cycle shows how routine action is embedded in time.

An important role of routines is to ‘coordinate’ (Stene 1940; Nelson & Winter, 1982). Malone and Crowston, (1994) explain coordination as the management of interdependencies among tasks that contributes towards organization performance. The empirical works of Segelod (1997), Knott and McKelvey (1999) and Gittel (2002) show that routines are effective in coordinating and controlling organization activities. Working on similar lines, our research shows the conditions in which the coordination ability of routines is deterred through amalgamation and this impacts organizational performance.

Both cases highlighted in this study signify the impact of amalgamation on coordination. Combination of routines dislodged a technical artefact from continuing its central coordination and controlling ability. This led to increase in operations costs. Superimposition on the other hand split the coordinating activity between two actors of different teams that impacted directly on the participants of the routine leading to their departure. Customer attrition in this case impacted revenue.

## **Conclusion**

This paper addresses the need for more sub-organizational, fine grained, research into acquisition integration, in order to better understand the links between synergy expectations and acquisition performance outcome. In order to open up the black box of acquisition integration, we conceptualise integrating organizations as the amalgamation of bundles of routines in order to achieve synergy gains through managerial actions. Through examining how routines amalgamate, and two different approaches to amalgamation (combination and imposition), we show how routines



can become unstable and thus result in negative performance outcomes. This is in stark contrast to acquirer expectations of ‘win-win’ situations of combining best practices or winning through imposing the ‘best routine’. As the two exemplar case studies show, while acquiring firms pursue integration in the hope of harnessing synergies and thereby reduce costs, in reality they end up with higher operations cost and overshoot integration budgets. Using a two tier analysis to drill down the higher order routine to its constituent routines and then summing up the action from bottom up, this research shows how aggregations of routines happen in organizations and the impact of such aggregations on the outcome of the integration process.

By using routines as unit of analysis for studying post acquisition integration, this study contributes to the routines literature. While extant literature uses VSR model to explain routine transformations, this paper explains routine transformations through routine aggregations. By studying routines before, during and after the integration we show how the aggregation of routines transform higher order routines. This study also suggests multiplicity of routines leads to unstable routines. The cases also reveal the important role played by context in shaping routines, through imposing different temporalities that can disrupt amalgamation processes. Finally we show that different approaches to routines as combination and superimposition can result in quite different organizational level outcomes. Whilst the intention behind these amalgamation approaches is to achieve synergy gains, the approach chosen leads to gains in some ways and unanticipated losses in others. This may go some way to explain the paradox of acquirers anticipating ‘win-win’ outcomes, by amalgamating two good routines for instance, and yet achieving sub-optimal results. It is at the level of analysis of routines and bundles of routines that we may find answers why acquisition integrations often underperform expectations.

## References

*Aggregation* (n.d.). Retrieved January 2, 2014 from Webster dictionary website

<http://www.merriam-webster.com/dictionary/aggregation>

Akkermans, H., and van Helden, K. (2002). Vicious and virtuous cycles in ERP implementation: a case study of interrelations between critical success factors. *European Journal of Information Systems*, 11(1), 35-46.

Angwin, D. (2007). *Mergers and Acquisitions*. Image Series. Oxford: Blackwell Publishing.

Barney, J.B. (1991). Firm resources and sustained competitive advantage. *Journal of Management*. 17(1), 99-120.

Barney, J., and Felin, T. (2013). What are microfoundations?. *Academy of Management Perspectives*, 27(2), 138–155.

Bauer, F., & Matzler, K. (2014). Antecedents of M&A success: The role of strategic complementarity, cultural fit, and degree and speed of integration. *Strategic Management Journal*, 35(2), 269-291.

Björkman, I., Stahl, G. K., and Vaara, E. (2007). Cultural differences and capability transfer in cross-border acquisitions: the mediating roles of capability complementarity, absorptive capacity, and social integration. *Journal of International Business Studies*, 38(4), 658-672.

Bourdieu, P. (1977). *Outline of a Theory of Practice*. 1st Ed. Cambridge: Cambridge University Press.

Bourdieu, P. (1990). *The logic of practice*. Sanford, US: Stanford University Press

Bower, J. L. (2001). Not all M&As are alike-and that matters. *Harvard business review*, 79(3), 92-105.

Cartwright, S. & C. L. Cooper (1992). *Managing Mergers, Acquisitions and Strategic Alliances – Integrating People and Cultures*. Oxford: Butterworth-Heinemann.

Cartwright, S., Teerikangas S., Rouzies, A., and Wilson-Evered, E. (2012). Methods in M&A—A look at the past and the future to forge a path forward. *Scandinavian Journal of Management*, 28 (2), 95-106

*Combination*. (n.d.). Retrieved August 2, 2013 from Oxford Dictionaries.com website  
<http://oxforddictionaries.com/definition/english/combination>

Cyert, R. M. and March, J. G. (1963). *A Behavioral Theory of the Firm*. Englewood Cliffs, NJ: Prentice-Hall.

D'Adderio, L. (2003). Configuring software, reconfiguring memories: The influence of integrated systems on the reproduction of knowledge and routines. *Industrial and Corporate Change*, 12(2), 321–350.

D'Adderio, L. (2008). The performativity of routines: Theorising the influence of artefacts and distributed agencies on routines dynamics. *Research Policy*, 37(5), 769–789.

D'Adderio, L. (2011). Artifacts at the centre of routines: performing the material turn in routines theory. *Journal of Institutional economics*, 7(2), 197-230.

Dosi, G., Faillo, M., and Marengo, L. (2008). Organizational capabilities, patterns of knowledge accumulation and governance structures in business firms: An introduction. *Organization Studies*, 29(8-9), 1165-1185.

Datta, D. K., and Grant, J. H. (1990). Relationships between type of acquisition, the autonomy given to the acquired firm, and acquisition success: An empirical analysis. *Journal of Management*, 16(1), 29–44.

Epstein, M. J. (2004). The drivers of success in post-merger integration. *Organizational Dynamics*, 33(2), 174-189.

Essén, A. (2008). Variability as a source of stability: studying routines in the elderly home care setting. *Human Relations*, 61(11), 1617–1644.

Feldman, M.S. (2003). A performative perspective on stability and change in organizational routines. *Industrial and Corporate Change*, 12(4), 727–752.

Feldman, M. S. (2004). Resources in emerging structures and processes of change. *Organization Science*, 15(3), 295-309.

Felin, T., Foss, N. J., Heimeriks, K. H., and Madsen, T. L. (2012). Microfoundations of routines and capabilities: Individuals, processes, and structure. *Journal of Management Studies*, 49(8), 1351-1374.

Giddens, A. (1984). *The constitution of society: introduction of the theory of structuration*. California: University of California Press.

Gittel, J. H. (2002). Coordinating mechanisms in care provider groups: Relational coordination as a mediator and input uncertainty as a moderator of performance effects. *Management Science*, 48(11), 1408-1426.

Glaser B.G. (1978). *Theoretical Sensitivity*. Mill Valley, California: Sociology Press.

Grant, R.M. (1991). The Resource-based Theory of competitive advantage: implications for strategy formulation. *California Management Review*, 33(3), 114-135.

Haspeslagh, P. C., and Jemison, D. B. (1991). *Managing acquisitions: Creating value through corporate renewal*, 1<sup>st</sup> Ed. New York: Free Press.

Homburg, C., and Bucerius, M. (2005). A Marketing perspective on mergers and acquisitions: how marketing integration affects postmerger performance. *Journal of Marketing*, 69(1), 95-113.

Howard-Grenville, J.A. (2005). ‘The persistence of flexible organizational routines: The role of agency and organizational context’. *Organization Science*, 16(6), 618–636.

Howard-Grenville, J., and Carlile, P. (2006). ‘The incompatibility of knowledge regimes: Consequences of the material world for cross-domain work’. *European Journal of Information Systems*, 15(5), 473–485.

Jemison, D. B., and Sitkin, S. B. (1986). Corporate acquisitions - a process perspective. *Academy of Management Review*, **11**(1), pp. 145-163.

Knott, A. M., and McKelvey, B. (1999). Nirvana efficiency: a comparative test of residual claims and routines. *Journal of economic behavior and organization*, 38(4), 365-383.

Malone, T. W., and Crowston, K. (1994). The interdisciplinary study of coordination. *ACM Computing Surveys (CSUR)*, 26(1), 87-119.

March, J. G., and Simon, H. A. (1958). *Organizations*. New York: Wiley.

Marks, M. L., & Mirvis, P. H. (1998). How mind-set clashes get merger partners off to a bad start. *Mergers and Acquisitions*, 33(2), 28-33.

Marks, M. L. and Mirvis, P. H. (2001). Making mergers and acquisitions work: Strategic and psychological preparation. *Academy of Management Executive*, 15(2), 80-92.

Mason, J. (1996). *Qualitative Researching*. London, U.K: Sage

Miles, M. B., and Huberman, A. M. (1984). *Qualitative data analysis: A sourcebook of new methods*. Thousand Oaks, CA: SAGE.

Miner, A.S., Michael, P. C., and Gong, Y. (2008). Organizational routines and organizational learning. In Becker, M.C. (Eds.), *Handbook of organizational routines* (pp. 152-186). Cheltenham: Edward Elgar Publishing.

Nelson, R. R. (1991). Why do firms differ, and how does it matter?. *Strategic Management Journal*, 12(S2), 61-74.

Nelson, R. R., and Winter, S. G. (1982). *An evolutionary theory of economic change*. Cambridge, MA: Harvard University Press.

Pablo, A. L., and Javidan, M. (2004). *Mergers and acquisitions: creating integrative knowledge*. Oxford : Blackwell

Palmatier, R. W., Miao, C. F., and Fang, E. (2007). Sales channel integration after mergers and acquisitions: A methodological approach for avoiding common pitfalls. *Industrial Marketing Management*, 36(5), 589-603.

Parmigiani, A., and Howard-Grenville, J. (2011). Routines revisited: Exploring the capabilities and practice perspectives. *The Academy of Management Annals*, 5(1), 413-453.

Pentland, B. T., and Feldman, M. S. (2007). Narrative networks: Patterns of technology and organization. *Organization Science*, 18(5), 781-795.

Pentland, B.T., and Feldman, M.S. (2008a). Designing routines: On the folly of designing artifacts, while hoping for patterns of action. *Information and Organization*, 18(4), 235–250.

Pentland, B.T., and Feldman, M.S. (2008b). Issues in empirical field studies of organizational routines. In M. Becker (Eds.), *Handbook of organizational routines* (pp. 281-300). Cheltenham: Edward Elgar

Pentland, B. T., Feldman, M. S., Becker, M. C., and Liu, P. (2012). Dynamics of organizational routines: a generative model. *Journal of Management Studies*, 49(8), 1484-1508.

Pettigrew, A. M. (2012). Context and Action in the Transformation of the Firm: A Reprise. *Journal of Management Studies*, 49(7), 1304-1328.

Rerup, C., and Feldman, M. (2011). Routines as a source of change in organizational schemata: The role of trial-and-error learning. *Academy of Management Journal*, 54 (3), 577-610.

Schoenberg, R. (2006). Measuring the Performance of Corporate Acquisitions: An Empirical Comparison of Alternative Metrics. *British Journal of Management*, 17(4), 361-370.

- Segelod, E. (1997). The content and role of the investment manual—A research note. *Management Accounting Research*, 8(2), 221-231.
- Shrivastava, P. (1993). Postmerger integration. *Journal of business strategy*, 7(1), 65–76.
- Simon, H.A. (1947). *Administrative behavior*. New York: Free Press.
- Sitkin, S. B. & Pablo, A. L. (2004). Leadership and the M&A process. In Pablo, A. L. & Javidan, M. (Eds.), *Mergers and Acquisitions: Creating Integrative Knowledge* (pp. 181-193). Oxford: Blackwell Publishing.
- Souder, W. E. & Chakrabarti, A. K. (1984). Acquisitions - do they really work out?. *Interfaces*, 14(4), 41-47.
- Stene, E. O. (1940). An approach to a science of administration. *The American Political Science Review*, 34(6), 1124-1137.
- Superimposition* (n.d.). Retrieved 2 January, 2014 from Oxford dictionaries website <http://www.oxforddictionaries.com/definition/english/superimpose>
- Turner, S. F., and Rindova, V. (2012). A balancing act: How organizations pursue consistency in routine functioning in the face of ongoing change. *Organization Science*, 23(1), 24-46.
- Waldman, D. A., and Javidan, M. (2009). Alternative forms of charismatic leadership in the integration of mergers and acquisitions. *Leadership Quarterly*, 20(2), 130-142.
- Winter, S. G. (2003). Understanding dynamic capabilities. *Strategic Management Journal*, 24(10), 991-995.
- Winter, S. G. (2012). Capabilities: their origins and ancestry. *Journal of Management Studies*, 49(8), 1402-1406

## Tables and Figures

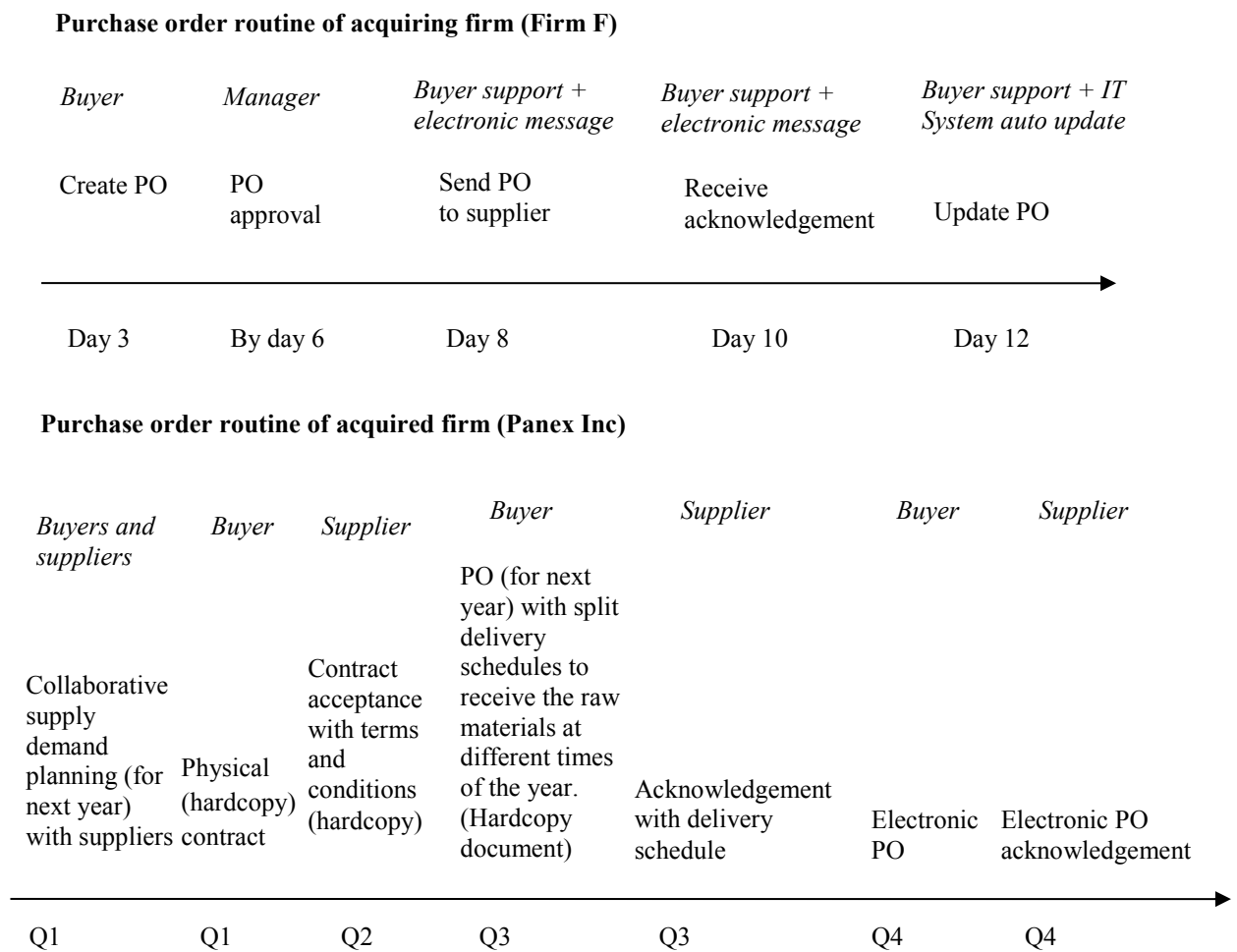


Figure 1 Purchase order routines of two firms



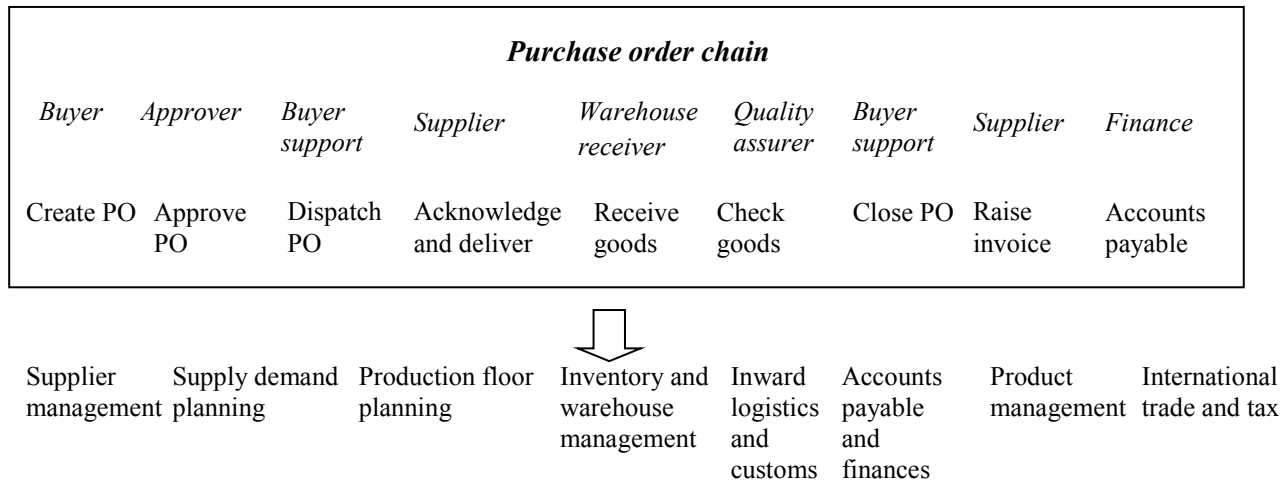


Figure 2 Purchase order routine and its interfaces

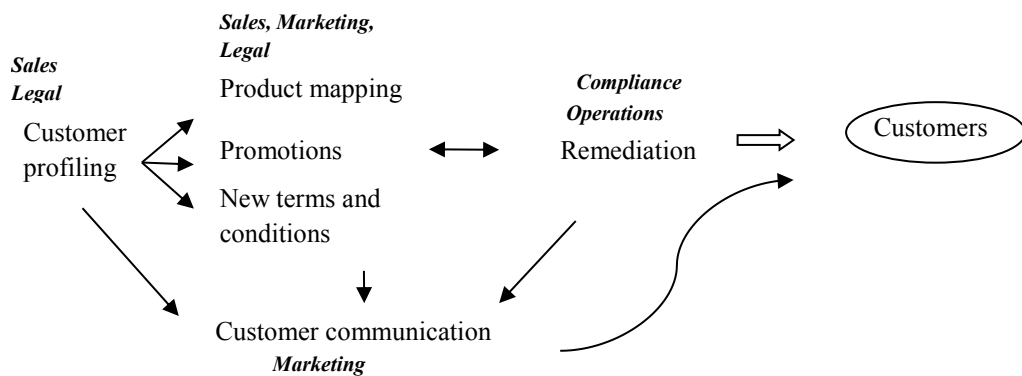


Figure 3 Interfacing routines of remediation

PO routine	<ol style="list-style-type: none"> <li>1) Level of nestedness, temporality and number of routine variations impacts the higher order routine outcome in case of routine combination</li> <li>2) Use of central technical artefact to control and coordinate routines inhibits the routine variations.</li> <li>3) On the other hand, large number of routine variation devoid the IT artefact of its ability to coordinate</li> </ol>	<p><b>Proposition 1:</b>  <i>Amalgamating two stable routines through 'combination' when enacted on different timescales for different contexts, results in crowded and scattered patterns of action.</i></p>
Remediation routine PO routine	<ol style="list-style-type: none"> <li>4) Acquisition outcomes can be experienced only over a period of time after the completion of integration.</li> <li>5) Following the completion of integration, aggregated routines need settling period with interventions</li> </ol>	<p><b>Proposition 2:</b>  <i>Over time, amalgamating a routine using 'combination' negatively affects internal efficiency whereas 'superimposing' a routine is efficient internally but has a negative effect on external stakeholders.</i></p> <p><b>Proposition 3:</b>  <i>External interference, either in the form of a new routine or context / structural change is needed to stabilize amalgamated routines.</i></p>

Table 1 Summary of findings

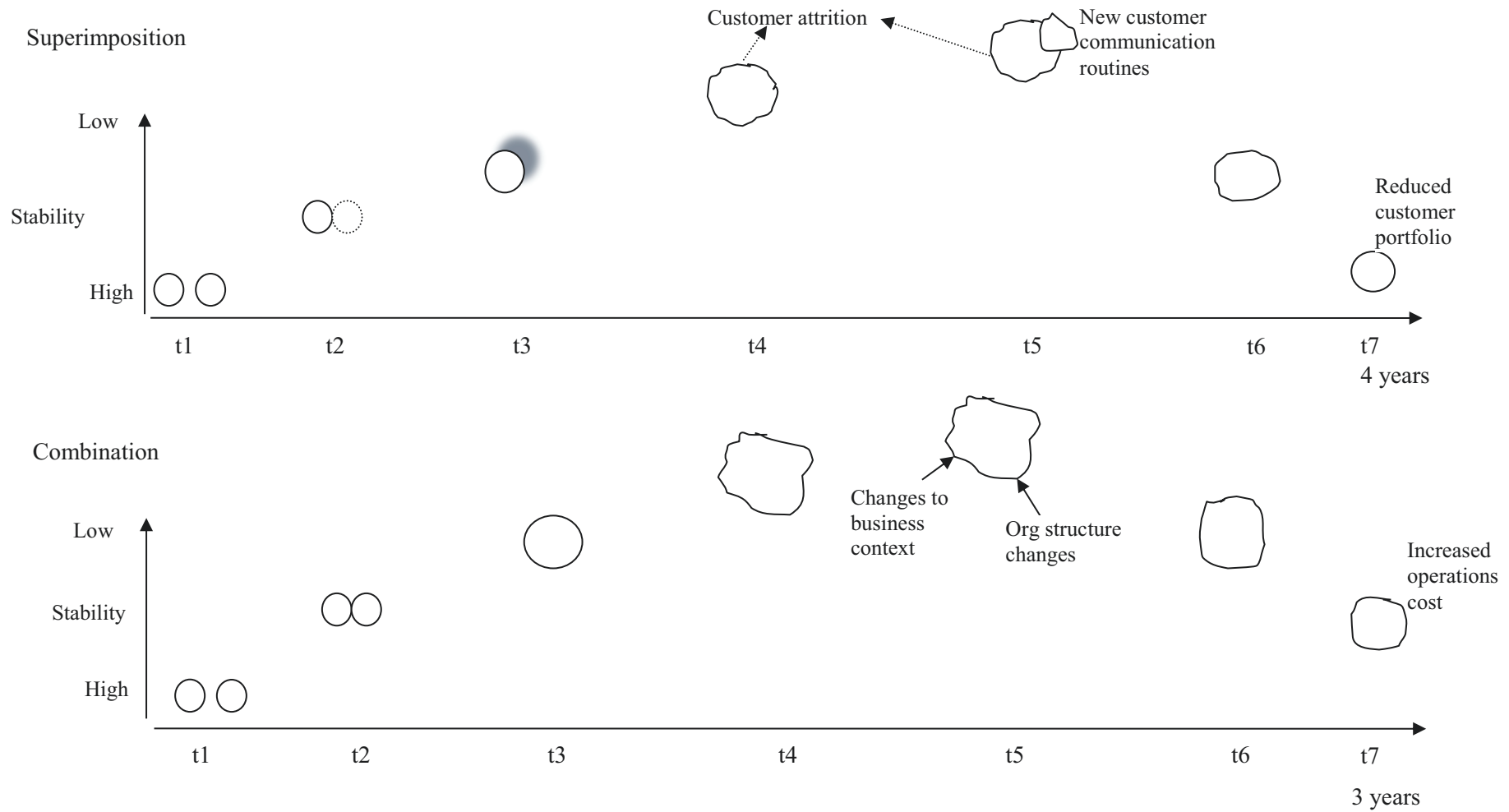


Figure 4 Routine transformations through combination and superimposition of routines